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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Mirjana Popovic

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BEYER WEAVER & THOMAS LLP

P.O. BOX 70250

OAKLAND, CA 94612-0250

EXAMINER

SINGH, RAMNANDAN P

ART UNIT

PAPER NUMBER

2614

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/765,465

Applicant(s)

POPOVIC ET AL.

Examiner

Ramnandan Singh

Art Unit

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date (i) Jan. 26, 2004; (ii) Dec. 13, 2004 | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed on Dec. 07, 2005.

Drawings

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because Fig. 3 requires legends to explain its contents. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

3. The specification is objected to because of the following informalities:

On page 5, line 30, the specification states "become **audile** detracting". It is suggested that the term "audile detracting" be replaced with the term "audible thereby detracting".

On page 9, line 8, the variables Y and YO in Equation (3) have not been defined. A similar thing holds for Appendix B, lines 5-9.

Appropriate correction is required.

Claim Objections

4. Claims 7 and 17 are objected to because of the following informalities:

In claims 7 and 17, the variables Y and YO have not been defined.

5. Claim 5 recites "wherein **said** during" in line 1. Delete the word "said".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-7, 10-11, 14-17, 20, 23 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Popovic et al [GB 2348350 A].

Regarding claim 1, Popovic et al teach a method of suppressing an echo signal in a communication path shown in Fig. 1, comprising the steps of:

monitoring a transmitted signal (i.e. a signal broadcast by the handset speaker 20) supplied to the communication path to determine an attribute thereof [Fig. 1; p. 4, lines 26-31];

generating a leaky mask based on the determined attribute of the transmit signal (60) and an attribute of a received echo signal (i.e. echo signal picked up by the handset microphone 22) [Fig. 2; p. 5, lines 21-28] ; and

partially cancelling the received echo signal using the leaky mask [Figs. 1-2; p. 4, line 26 to p. 6, line 3; p. 12, lines 3-8].

Claim 14 is essentially similar to claim 1 except for a power level calculator. Popovic et al also teach a power level calculator (60) [Fig. 2; p. 5, line 29 to p. 6, line 3; p. 13, line 29 to p. 14, line 4].

Claim 20 is essentially similar to claim 1 except a digital signal processor (DSP) to execute echo suppression. Popovic et al also teach a DSP [Fig. 2; p. 5, line 29 to p. 6, line 3].

Regarding claim 23, Popovic et al teach, in a telephone device including a handset having a speaker to broadcast incoming signals and a microphone to receive outgoing signals, an echo suppressor to suppress echo signals picked up by the microphone as a result of acoustic coupling between the speaker and microphone shown in Fig. 1, comprising:

a power level calculator (60) determining the power level of transmitted signals supplied to the communication path [[Fig. 2]; and

a mask generator responsive to the power level calculator and generating leaky masks, the leaky masks being generated as a function of the determined power level and the noise level of received echo signals, the leaky masks being applied to the received echo signals thereby to suppress partially the received echo signals [Figs. 1-2; p. 4, line 26 to p. 6, line 3; p. 12, lines 3-8; p. 7, line 29 to p. 8, line 5].

Regarding claim 26, Popovic et al teach an echo suppressor to suppress echo signals generated in a communication path shown in Fig. 5, comprising:

an echo canceller (70) in parallel with the communication path (71) , the echo canceller having a transfer function approximating that of the communication path and generating estimated echo signals in response to transmitted signals supplied to the communication path, the echo canceller subtracting the estimated echo signals from echo signals received from the communication path to generate residual echo error signals [p. 8, lines 6-20]; and

a processor (80) receiving the estimated echo signals and the residual echo error signals, the processor determining the power level of the transmitted signals supplied to the communication path and generating leaky masks, the leaky masks being generated as a function of the determined power level of the transmitted signals and the noise level of received echo signals, the leaky masks being applied to the residual echo error signals thereby to suppress partially the residual echo error signals [Fig. 5; p. 8, line 21 to p. 9, line 8; p. 15, lines 4-27].

Regarding claim 2, Popovic et al further teach the method, wherein the attribute of the transmitted signal is the power level (60) thereof [Fig. 2; p. 5, lines 24-28; p. 12, lines 10-11].

Regarding claim 3, Popovic et al further teach the method, wherein the attribute of the received echo signal (i.e. signal received by the telephone device 14) is the noise level thereof [p. 5, line 30 to p. 6, line 1; p. 12, lines 10-11].

Regarding claim 4, Popovic et al further teach the method, wherein the generating includes the steps of: generating a suppression mask based on the power level of the transmitted signal; generating noise leaking bits based on the noise level of the received echo signal; and combining the suppression mask and noise leaking bits to yield the leaky mask [p. 5, line 29 to p. 6, line 3].

Regarding claim 5, Popovic et al further teach the method, wherein during the generating an envelope of the power level of the transmitted signal is generated, the envelope being used to select the suppression mask [p. 6, lines 4 to p. 7, line 18; p. 12, lines 16-17].

Claim 15 is essentially similar to claim 5 and is rejected for the reasons stated above.

Regarding claim 6, Popovic et al further teach the method, wherein the envelope is generated by an infinite impulse response (IIR) lowpass filter [p. 6, lines 7-14; p. 12, lines 19-20].

Claim 16 is essentially similar to claim 6 and is rejected for the reasons stated above.

Regarding claim 7, Popovic et al further teach the method, wherein the IIR lowpass filter generates the envelope by solving the equation: $AbsY = (1 - \alpha)AbsY + \alpha * AbsY_{sub.0}$ where α is a parameter of the IIR filter [p. 6, lines 9-14; p. 12, lines 22-25].

Claim 17 is essentially similar to claim 7 and is rejected for the reasons stated above.

Regarding claim 10, Popovic et al further teach the method, wherein during the generating, an estimated echo signal is also generated based on the power level of the transmitted signal [p. 6, lines 23-29] and wherein the partially cancelling step is performed after the estimated echo signal is subtracted from the received echo signal [p. 6, line 30 to p. 28; p. 12, lines 27-32; p. 13, lines 20-23].

Regarding claim 11, Popovic et al further teach the method, wherein the estimated echo signal is generated using a linear algorithm (such as LMS algorithm) approximating the transfer function of the communication path [p. 8, lines 12-20; p. 13, lines 25-27].

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 8-9, 12-13, 18-19, 21-22, 24-25 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popovic et al as applied to claims 1, 10, 14, 20, 23 and 26 above, and further in view of Ashley et al [US 5,295,136].

Regarding claim 8, although Popovic et al teach a filter mask to partially cancel a received echo, they do not teach expressly inhibiting echo cancellation during a double talk state.

Ashley et al teach inhibiting the partial canceling of an echo by not updating the echo canceller filter coefficients during a double-talk state [col. 6, lines 31-42].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Ashley et al with Popovic et al to inhibit the mask generator to pass the signal without echo cancellation (i.e. a full pass state) during a double-talk state in order to reduce divergence of the filter [Ashley et al; col. 6, lines 40-45].

Claims 12, 18, 21, 24, 27 are essentially similar to claim 8 and are rejected for the reasons stated above.

Regarding claim 9, Ashley et al further teach the method, wherein double-talk is declared when the power level of the received echo signal exceeds a threshold value, and thereby the mask generator is inhibited [col. 7, lines 33-39].

Claims 13, 19, 22, 25, 28 are essentially similar to claim 9 and is rejected for the reasons stated above.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(i) Tahernezhaadi et al [US 6,347,140 B1] teach detecting a double-talk state [col. 2, lines 1-27]; and

(ii) Ashley et al [US 5,535,194] teach an echo canceller with double-talk immunity [col. 2, lines 9-35].

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (571) 272-7529. The examiner can normally be reached on M-TH (8:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (571) 272-7547. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ramnandan Singh
Examiner
Art Unit 2614

